NEWSKY – NEtWorking the SKY for Aeronautical Communications

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ICNS'07

DLR

Fact Sheet

- European Commission Project (STREP) within DG TREN

Contract number:	37160
Starting date:	February 26th, 2007
Ending date:	August 26th, 2009
Duration:	30 months
Man-power effort:	250 PM
Total financial volume:	3.6 M€
Refunded by EC:	2.1 M€

Project Partners

- **Germany**:
  - German Aerospace Center – DLR (prime)
  - TriaGnoSys GmbH
  - Deutsche Flugsicherung GmbH (DFS)
- **Austria**:
  - University of Salzburg
  - Frequentis GmbH
- **France**:
  - Thales Alenia Space
- **Great Britain**:
  - QinetiQ Ltd

Vision of “Networking the Sky”

- **Global information availability and sharing** and the resulting global situation awareness will be a **key enabler** for future aeronautical system efficiency.

- The NEWSKY project aims to develop a concept of a **global, heterogeneous communication network** for aeronautical communications to increase information availability and sharing.

- NEWSKY pursue the vision of “Networking the Sky” by integrating **different communication systems** and **different applications and services** into a single, seamless aeronautical network.

State-of-the-Art

- Current air traffic management communication systems are still mainly based on **analogue voice** (DSB-AM) using VHF and HF frequencies.
  - Inefficient use of the available spectrum
  - Communication systems will be completely overloaded soon

- **Data link** technologies under deployment:
  - VDL Mode 2, HFDL
  - Satellite Communications: Aero-H

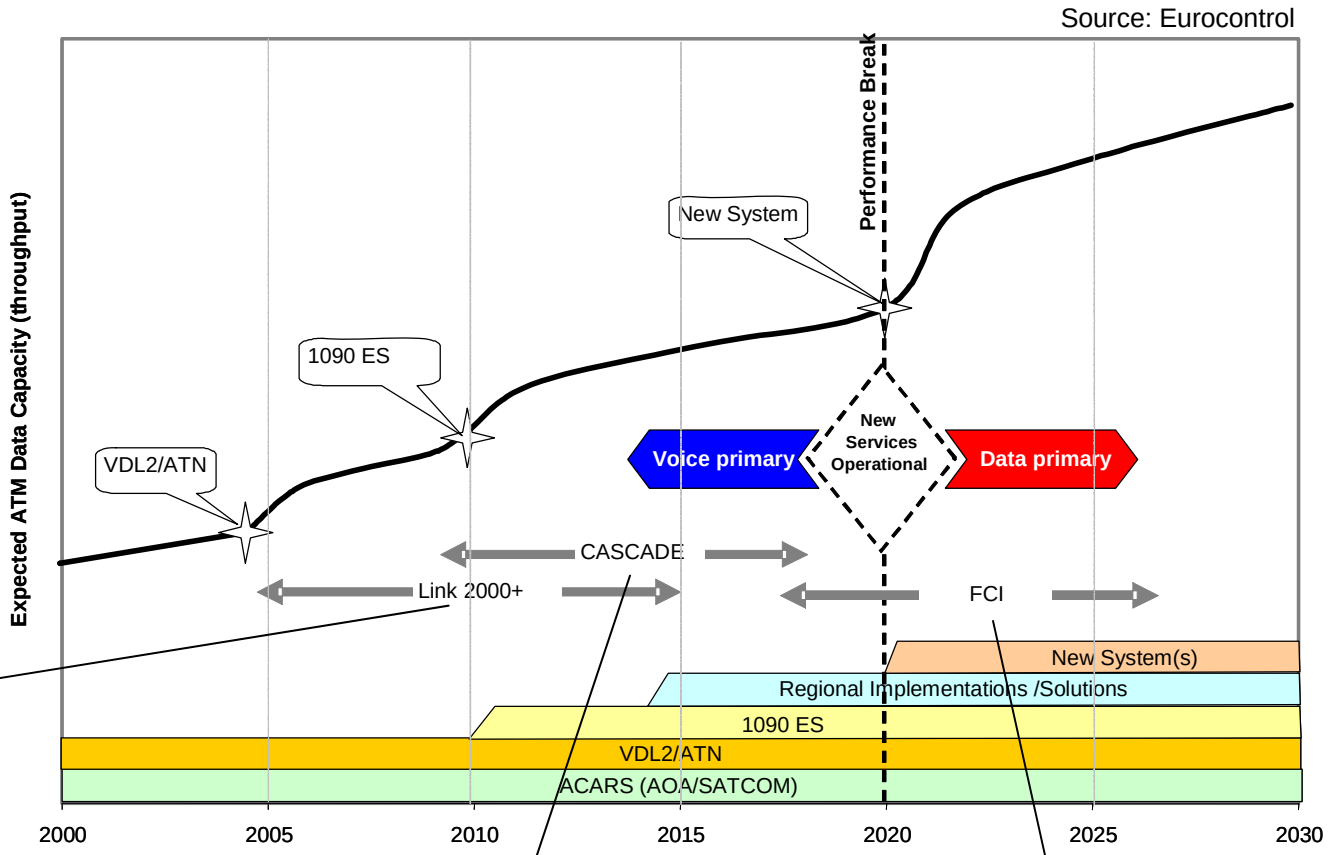
Future Aeronautical Trends

- **Less voice, more data** communications.
- **Network - Centric Operations**: increased information exchange among the various parties in the aviation community, CDM and SWIM.
- More information available at the cockpit - more autonomous operations.
- Less route based airspace design, more **negotiated 4D trajectories.**
- More **Aeronautical Passenger Communications** (APC).

  - Communications are a key enabler for future aeronautical systems!

Future Aeronautical Trends

Source: Eurocontrol



Implementation of VDL2/ATN for new data services

Implementation of ADS-B for surveillance, further data services

Future Communications Infrastructure

Current Research and Development Efforts

- **Actions currently undertaken**
  - Link 2000+ and Cascade programs by Eurocontrol
  - FCS and FCI jointly developed by FAA and Eurocontrol
  - NextGen
  - SESAR
  - ICAO ACP activities
  - NASA/ACAST MCNA project
  - Related, complementary EC projects: ANASTASIA, ASPASIA, ATENAA, B-VHF, EMMA, MINERVAA, SWIM SUIT, Wireless Cabin

- **Expectation**: Several aeronautical communications systems for different application areas
- **Missing**: Overall approach, integrated network for civil aeronautical communications

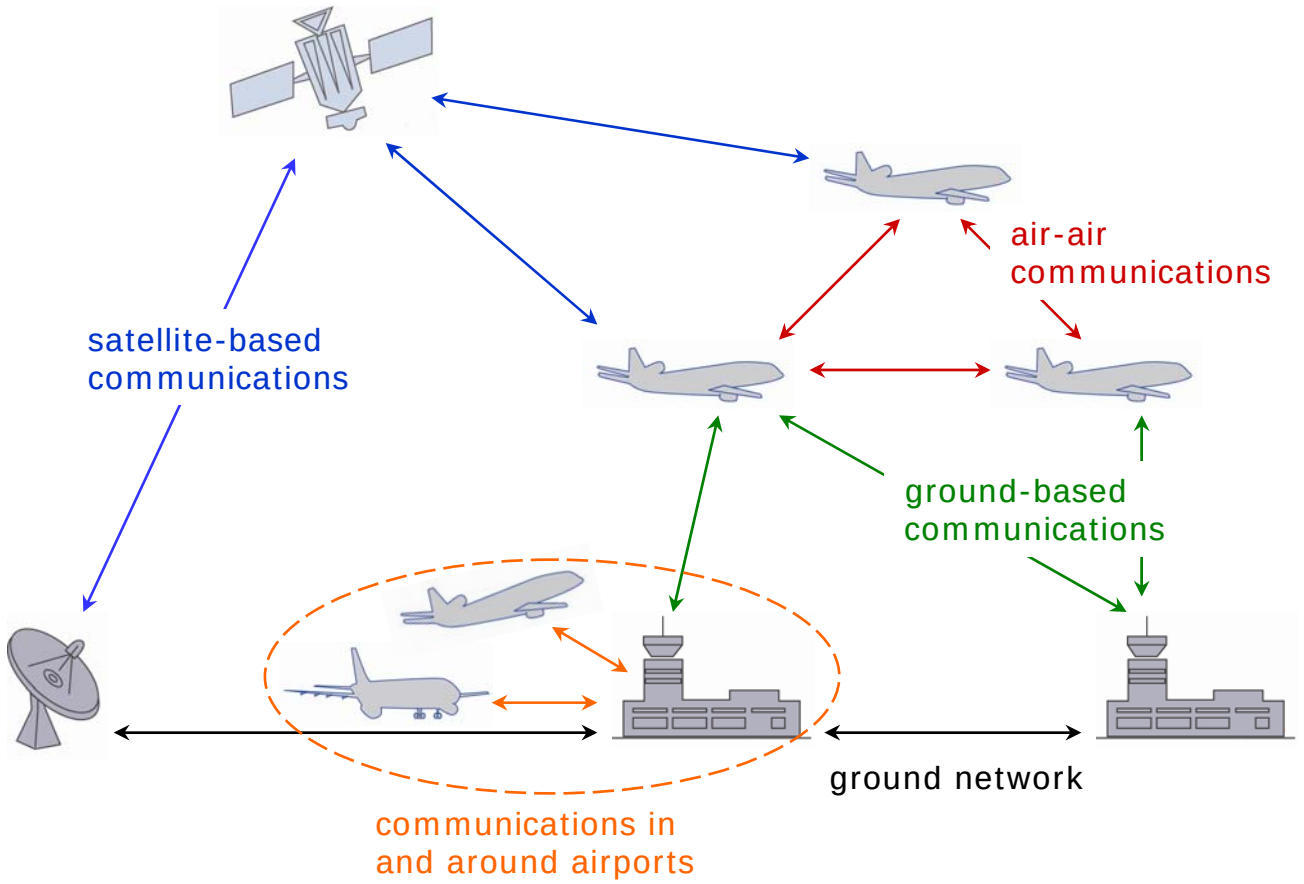
NEWSKY Approach

- The NEWSKY project aims to develop a concept of a **global, heterogeneous communication network for civil aeronautical communications.**

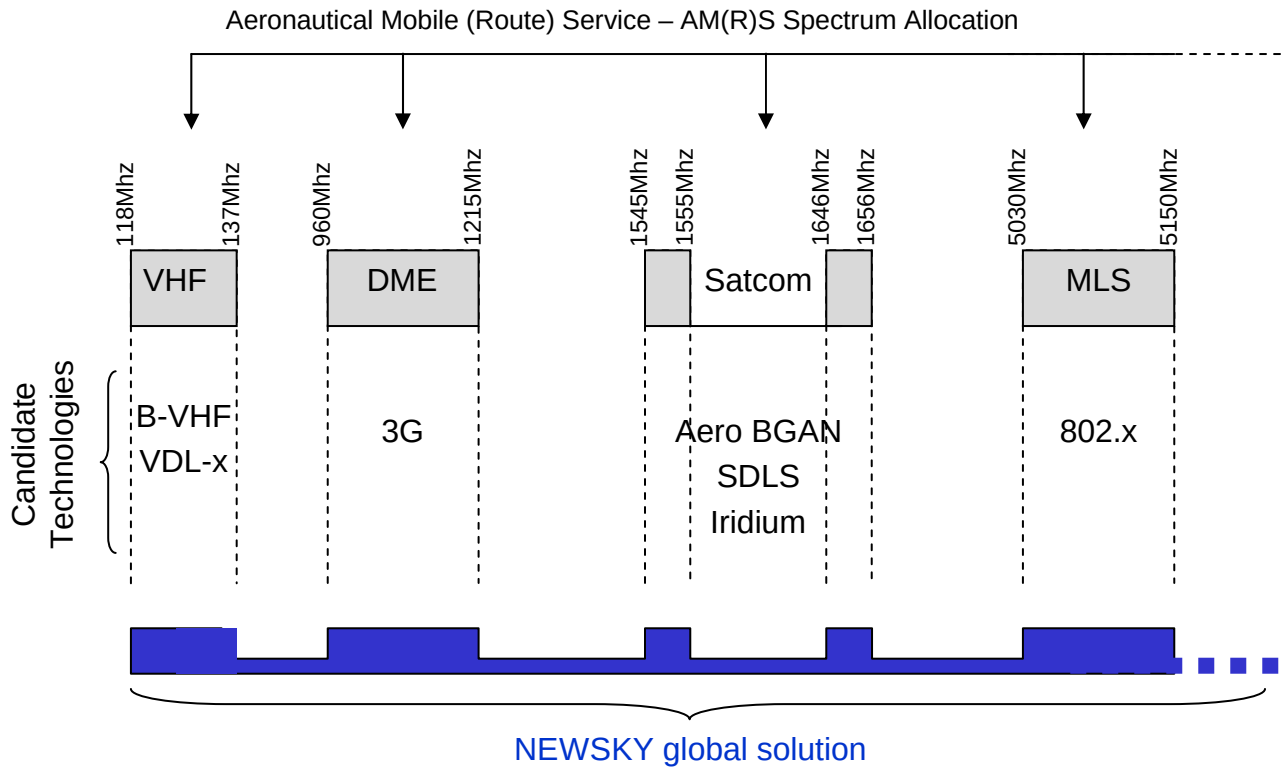
- NEWSKY pursue the vision of **“Networking the Sky”** by integrating
  - different communication links
  - different communication technologies
  - different applications and services

  into a single, seamless aeronautical network.

Integration of Different Communication Links



Integration of Different Communication Technologies

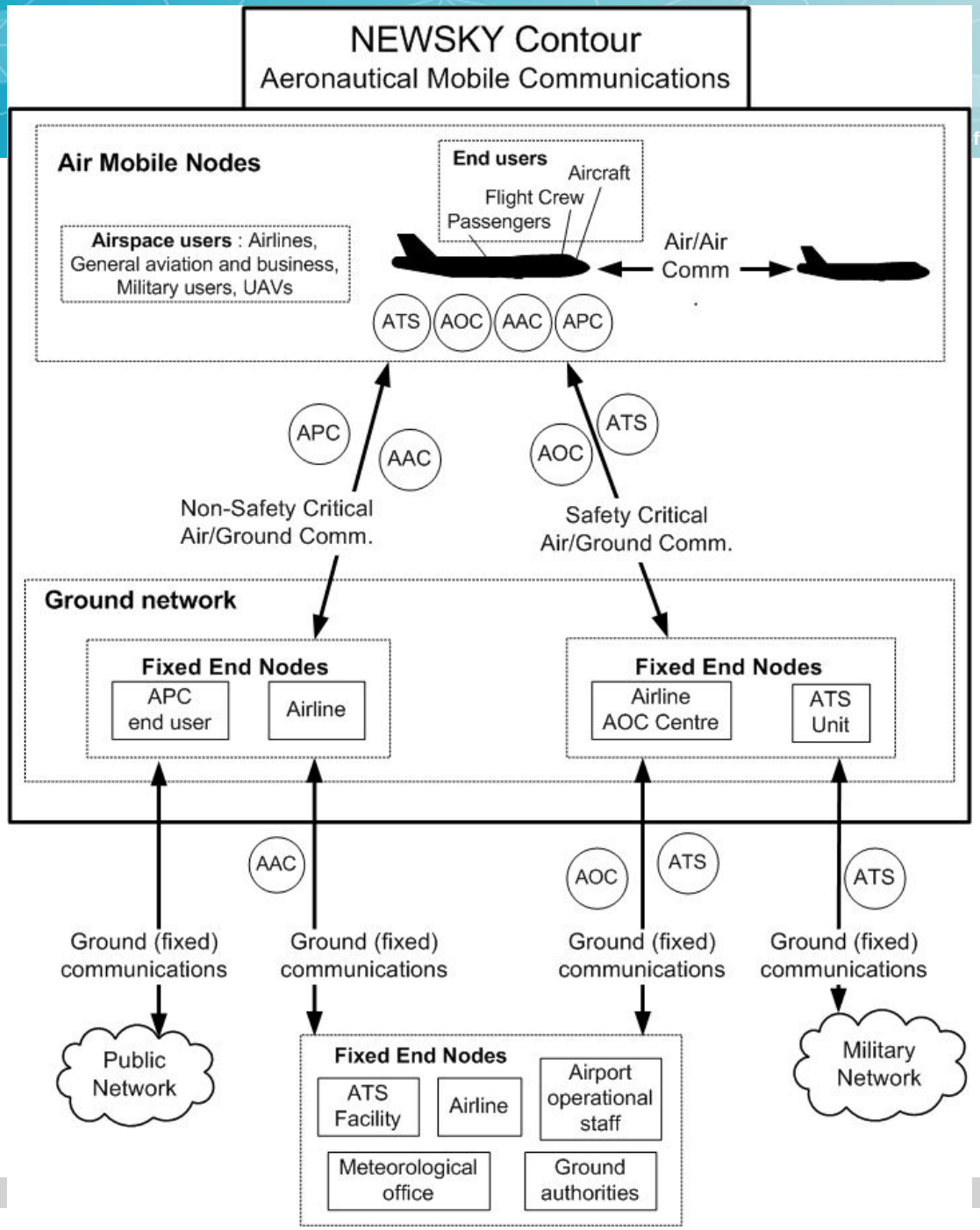


Integration of Different Applications and Services

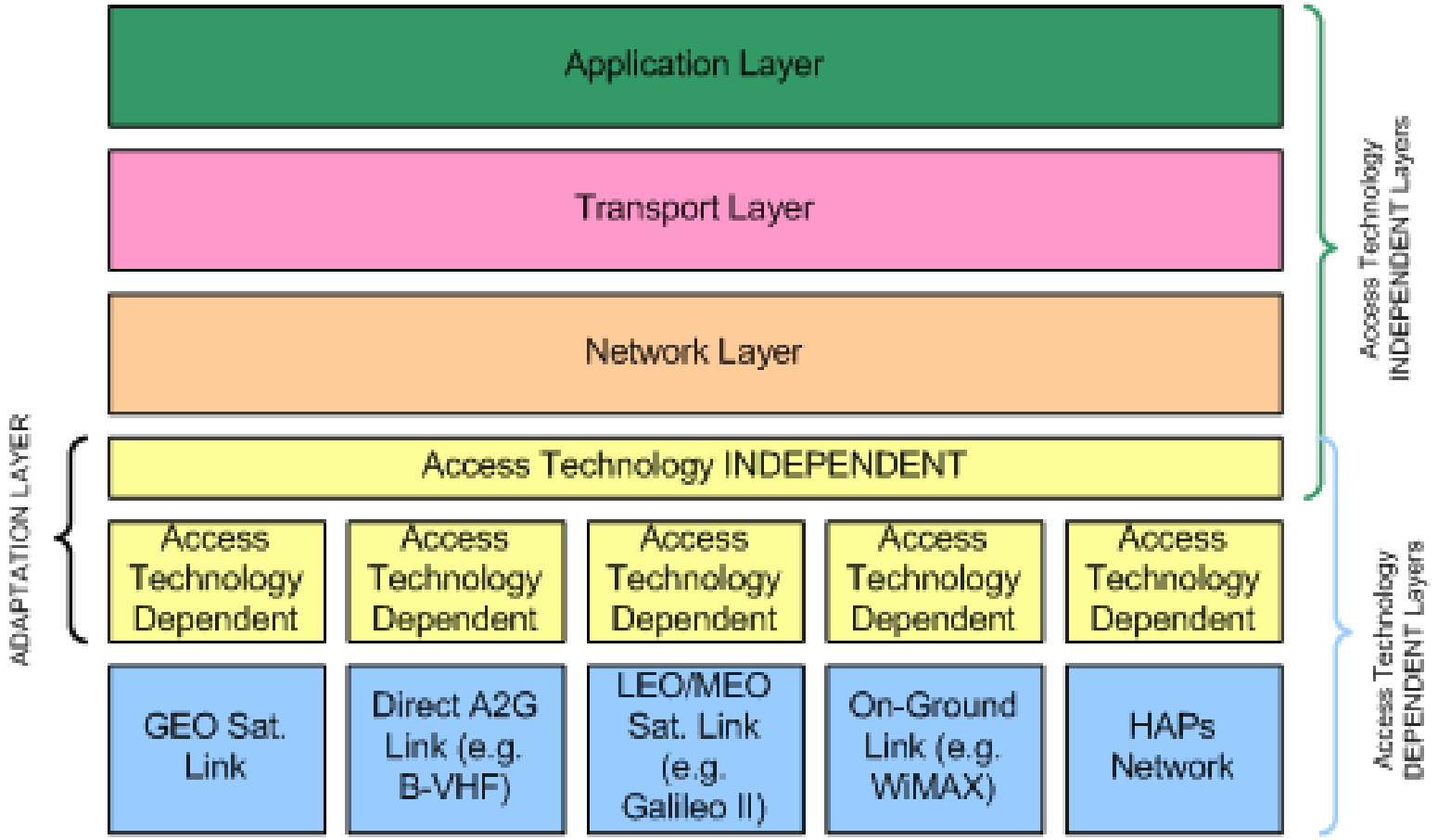
- **Safety Critical Services**:
  - Air Traffic Services (ATS)
  - Airline Operational Communication (AOC)

- **Non-Safety Critical Services**:
  - Airline Administrative Communication (AAC)
  - Aeronautical Passenger Communication (APC)

NEWSKY Contour



Potential NEWSKY Protocol Architecture



- cp. IEEE802.21: Media independent handover function

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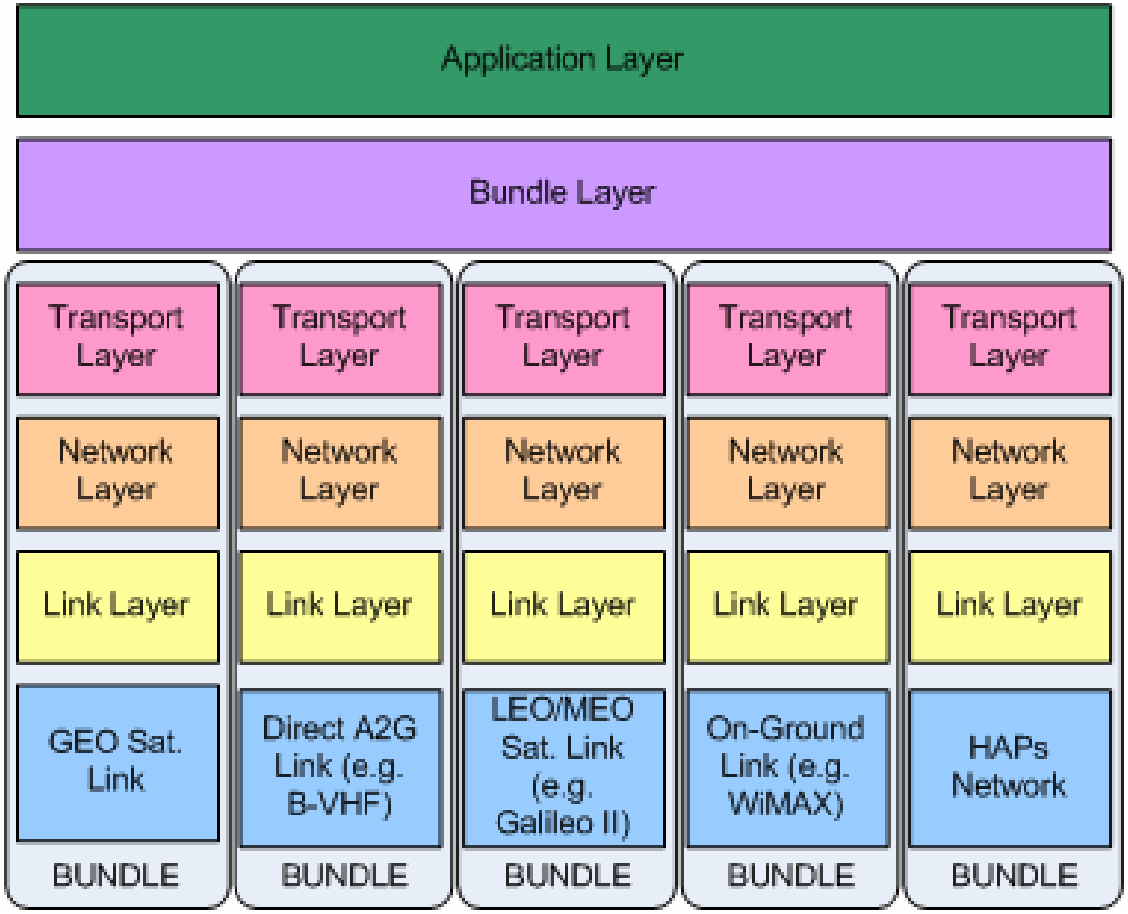

Promising Network Layer Technologies

- IPv6 as most promising candidate.
  - Large address space (128 bit)
  - Advanced mobility support
  - QoS provisions
  - Expected to be COTS within the timeframe of NEWSKY (2020+)

  - Useful IETF Concepts:
    - Mobile IPv6
    - Network Mobility (NEMO)
    - Multiple Nodes and Multiple Interfaces in IPv6 (MONAMI6)

NEWSKY Benefits

- Benefits of NEWSKY approach
  - Increased redundancy, thus, increased **availability and reliability**
  - Increased **capacity** and **coverage** of overall system
  - Globally **optimized network performance** by using the right communication link technology at the right place and time
  - Communication system completely **transparent** to end users (pilots and controllers)
  - **Modular system concept** which enables simple introduction of new technologies
  - **Efficient and flexible** utilization of the overall aeronautical frequency spectrum
  - Enable aircraft to be included in **CDM and SWIM,** enhanced **information availability and sharing**

NEWSKY Challenges

- High degree of network **heterogeneity** and high demands on **mobility**, **reliability** and **security.**

- Development of an innovative networking concept comprising
  - appropriate link independent adaptation layer
  - routing algorithms
  - system-level resource management
  - seamless hand-over techniques
- Development of appropriate QoS classes and priority rules
- Ensuring network security

Further Information and Contact

- **Further information:** www.newsky-fp6.eu

- **Contact:**

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